

IN THE UNITED STATES  
PATENT AND TRADEMARK OFFICE

PATENT APPLICATION

APPLICANT(S): Dimitri Kanevsky,  
Stephane Herman Maes

TITLE: Methods and Apparatus for  
Verifying the Identity of a User  
Requesting Access Using  
Location Information

"Express Mail" Label No.: EJ148760520US

I hereby certify that this paper or fee is being  
deposited with the United States Postal Service  
"Express Mail Post Office to Addressee" service  
under 37 C.F.R. §1.10 on the date indicated below  
and is addressed to: Assistant Commissioner for  
Patents, Washington, D.C. 20231.

Date of Deposit: November 9, 1999

Signature: Kevin M. Mason

ASSISTANT COMMISSIONER FOR PATENTS  
WASHINGTON, D.C. 20231

SIR:

Enclosed are the following papers relating to the above-named application for patent:

Application - 10 pages of Specification, 10 pages of Claims and 1 page of Abstract  
3 Sheets of informal drawing(s)  
Declaration (unexecuted)  
Check in the amount of \$1,990.00 to cover the filing fee

CLAIMS AS FILED				
	NO. FILED	NO. EXTRA	RATE	CALCULATIONS
Total Claims	58-20 =	38	x \$18 =	\$684
Independent Claims	10 - 3 =	7	x \$78 =	\$546
Multiple Dependent Claim(s), if applicable			\$260 =	\$0
Basic Fee				\$760
TOTAL FEE:				\$1,990

Please file the application and find enclosed a check in the amount of \$1,990.00 to cover the filing fee. In the event of non-payment or improper payment of a required fee, the Commissioner is authorized to charge or to credit **Deposit Account No. 50-0762** as required to correct the error. Duplicate copies of this letter are enclosed.

Please address all correspondence to: **Kevin M. Mason, Ryan & Mason, L.L.P., 90 Forest Avenue, Locust Valley, New York 11560.** Telephone calls should be made to the under-signed attorney at (203) 255-6560.

Respectfully,

Kevin M. Mason  
Kevin M. Mason  
Reg. No. 36,597  
Attorney for Applicant(s)

Date: November 9, 1999  
**Ryan & Mason, L.L.P.**  
90 Forest Avenue  
Locust Valley, New York 11560

11/09/99  
JC678 U.S. PTO

JC678 U.S. PTO  
09/437352  
11/09/99

# **METHODS AND APPARATUS FOR VERIFYING THE IDENTITY OF A USER REQUESTING ACCESS USING LOCATION INFORMATION**

## **Field of the Invention**

5                   The present invention relates generally to access control techniques, and more particularly, to a method and apparatus for restricting access to a particular device or secure facility.

## **Background of the Invention**

10                   Computers and other devices, as well as secure facilities, often contain proprietary and/or sensitive information, which could be compromised if accessed by unauthorized individuals. Thus, computer devices and secure facilities often incorporate security techniques, such as database access control mechanisms, to prevent unauthorized users from accessing, obtaining or altering the proprietary and/or sensitive information. Authentication techniques allow users to prove their identity and obtain authorized access to a given device or secure facility.

                  A number of authentication protocols have been developed to prevent the unauthorized access of such devices or locations. For example, access control mechanisms typically utilize some variation of an alphanumeric personal identification number (PIN) or password, that is presumably known only to the authorized user. Upon attempting to access a given device or physical location, the user enters the appropriate password, to establish his or her authority. Many users select a PIN or password that is easy to remember. Thus, there is a significant risk that such passwords may be guessed or otherwise compromised, in which case an attacker can access the given device or location.

25                   To minimize the risk that a password will be compromised, the number of login attempts that may be attempted are often limited, so that an attacker cannot keep trying different passwords until successful. In addition, users are often encouraged or required to change their password periodically. One-time passwords have also been proposed to further

increase security, where users are assigned a secret key that may be stored, for example, on a pocket token or a computer-readable card. Upon attempting to access a desired device or location, a random value, referred to as a “challenge,” is issued to the user. The pocket token or computer-readable card then generates a “response” to the challenge by encrypting the received challenge with the user’s secret key. The user obtains access to the device or location provided the response is accurate. In order to ensure that the pocket token or computer-readable card is utilized by the associated authorized user, the user typically must also manually enter a secret alphanumeric PIN or password.

In further variations, access control mechanisms have secured access to devices or secure locations by evaluating biometric information, such as fingerprints, retinal scans or voice characteristics. For a more detailed discussion of one such biometric-based access control system, see, for example, United States Patent Number 5,897,616, entitled “Apparatus and Methods for Speaker Verification/Identification/Classification Employing Non-Acoustic and/or Acoustic Models and Databases,” United States Patent Application Serial Number 09/008,122, filed January 16, 1998, entitled “A Portable Information and Transaction Processing System and Method Utilizing Biometric Authorization and Digital Certificate Security,” and United States Patent Application Serial Number \_\_\_\_\_, filed October 14, 1999, entitled “Point of Sale and Vending Service Payment via Portable Communication Device” (Attorney Docket Number YO999-208), each assigned to the assignee of the present invention and incorporated by reference herein.

While such authentication tools reduce the unauthorized access of equipment or a secure facility, they suffer from a number of limitations, which if overcome, could dramatically increase the utility and effectiveness of such tools. For example, there is currently no mechanism to ensure that a person associated with a given password is physically present at the location where the password is utilized. A need therefore exists for an access control mechanism that uses the global positioning system to verify the location of a person who is requesting access to a secured device or location.

### **Summary of the Invention**

Generally, a location-based access control method and apparatus are disclosed for limiting access to a device or secure facility by verifying the location of an authorized user. According to one aspect of the invention, a GPS-based access control system confirms that the user requesting access to a device or secure location is physically present at the location of the device or secure location. In further variations, the location of the user is confirmed using, for example, triangulation techniques or techniques used to implement the enhanced cellular 911 system. In the illustrative embodiment, the location of the user is obtained from an individual GPS system carried by each user on a portable device, such as a pocket token, computer-readable card, cellular telephone or watch.

The GPS system utilizes a satellite network to identify the exact location of objects using radio signals received from the object. The individual GPS is used to obtain the physical location of the authorized user at the time of an access control request. If the location of a person making an access control request does not coincide with the coordinates of the individual GPS that is being worn by the authorized user, then the person requesting access is unauthorized.

Each device or secure location includes a GPS-based access control system that issues a challenge to the user, upon an attempt to access the device or location, to establish the user's authority. For example, the challenge may include a request for a password, a request for a pocket token or a computer-readable card, or a request for biometric information, such as fingerprints, retinal scans or voice characteristics. The GPS-based access control system queries the central GPS system to identify the physical location of the authorized user who is registered with the entered password. The central GPS system communicates with the individual GPS system associated with the authorized user who is registered with the entered password, pocket token, computer-readable card or biometric information, to determine the location. The central GPS system transmits the location

coordinates to the GPS-based access control system central server. The measured location of the authorized user is compared with the known location of the device for which access has been requested. If the coordinates corresponding to the measured location of the authorized user do not match the coordinates of the device for which access has been requested, then the access request is rejected.

A more complete understanding of the present invention, as well as further features and advantages of the present invention, will be obtained by reference to the following detailed description and drawings.

### **Brief Description of the Drawings**

FIG. 1 illustrates a network environment in which an illustrative global positioning system (GPS)-based access control system in accordance with the present invention may operate;

FIG. 2 is a sample table from the authorized user database of FIG. 1; and

FIG. 3 is a flow chart describing an exemplary GPS-based access control process incorporating features of the present invention.

### **Detailed Description of Preferred Embodiments**

FIG. 1 illustrates a network environment 100 in which the present invention can operate. As shown in FIG. 1, a global positioning system (GPS)-based access control system 130 restricts access to devices 102, 105 that are connected to the network 100. According to a feature of the present invention, the GPS-based access control system 130 confirms that the user requesting access to the device or secure location is physically present at the location of the device or secure location. The location of the user is obtained from an individual GPS system 140 carried by each user on a portable device, such as a pocket token, computer-readable card, cellular telephone or watch. GPS watches are commercially available, for example, from Casio Computer Company Ltd. of Tokyo, Japan. While the

present invention is illustrated herein using a GPS system to determine the location of a user, any well-known technique can be used, including those mentioned herein, as would be apparent to a person of ordinary skill.

According to a feature of the invention, the GPS system is utilized to verify the identity of a user requesting access to a given device or secure location, by ensuring that the person is physically present at the location of the given device or secure location. The GPS system utilizes a satellite network to identify the exact location of objects using radio signals received from the object, in a known manner. Each authorized user has an associated individual GPS 140. The present invention provides a new security measure that uses an individual GPS 140 to obtain the physical location of the authorized user at the time of an access control request. If the location of a person making an access control request does not coincide with the coordinates of the individual GPS 140 that is being worn by the authorized user, then the person requesting access is unauthorized. In other words, if the individual GPS 140 associated with the authorized user is not at the location of the device 102, 105 that is being accessed, then access is denied.

In further variations, the location of the user can be confirmed using, for example, triangulation techniques or techniques used to implement the enhanced cellular 911 system. For a detailed discussion of enhanced 911 cellular service (EC911), see Meyer et al., "Wireless Enhanced 9-1-1 Service – Making It A Reality," Bell Labs Technical Journal, 188-202 (Autumn 1996), incorporated by reference herein. For a general discussion of various systems and techniques for detecting the location of a user using a transmitter, see, for example, <http://www.cwt.vt.edu/projects/dominion>; <http://www.ecst.csuchico.edu/~ian/cnm.html>; "News You Can Use," <http://www.usnews.com/usnews/issue/980622/22cell.htm> (June 22, 1998), <http://centralohio.thesource.net/Files3/9606135.html> (June 13, 1996) and Bluetooth, <http://www.bluetooth.com/v2/default.asp>, each incorporated by reference herein. In yet another variation, the location of the person requesting access to a particular device or

facility, can be asked questions about the location of the device or facility. The response can be processed by a speech recognition system to validate the identity of the user, and the accuracy of the response can be used to confirm that the user is physically present at the device or facility. See, for example, United States Patent Number 5,897,616, entitled  
5 “Apparatus and Methods for Speaker Verification/Identification/Classification Employing Non-acoustic And/or Acoustic Models and Databases.”

For example, the identity of a user can be obtained or verified by requiring the user to place a telephone call to the access control system 130 from a predefined cellular telephone. Voice recognition technology can be used to identify or verify the identity of the  
10 user, and the enhanced cellular 911 technology can be utilized to confirm that the user requesting access to the device or secure location is physically present at the location of the device or secure location. Well-known caller identification (“caller id”) techniques can be used to confirm that the user requesting access is using the appropriate cellular telephone. For a more detailed discussion of speaker identification techniques and the use of caller  
15 identification techniques to confirm that the user requesting access is using the appropriate cellular telephone application, see, for example, United States Patent Number 5,897,616, entitled “Apparatus and Methods for Speaker Verification/Identification/Classification Employing Non-Acoustic and/or Acoustic Models and Databases,” United States Patent  
20 Application Serial Number 08/788,471, filed January 28, 1997, entitled “Text Independent Speaker Recognition For Transparent Command Ambiguity Resolution and Continuous Access Control,” United States Patent Application Serial Number 08/787,029, filed January 28, 1997, entitled “Speaker Model Prefetching,” and United States Patent Application Serial  
25 Number 08/851,982, filed May 6, 1997, entitled “Speaker Recognition Over Large Population with Fast and Detailed Matches,” each assigned to the assignee of the present invention and incorporated by reference herein.

As shown in FIG. 1, the device for which the user is requesting access may be, for example, an automated teller machine (ATM) 102, a computing device 105 or an

access control mechanism (not shown), such as a card-reader, that restricts access to a secure location. Each device 102, 105 includes a GPS-based access control system 130 that issues a challenge to the user, upon an attempt to access the device 102, 105, to establish the user's authority. For example, the challenge may include a request for a password, a request for a pocket token or a computer-readable card, or a request for biometric information, such as fingerprints, retinal scans or voice characteristics. In addition, according to a feature of the present invention, the GPS-based access control system 130 queries the central GPS system located on satellites 101 to identify the physical location of the authorized user who is registered with the entered password or other response to the issued challenge. The central GPS system 101 communicates with the individual GPS system 140 associated with the authorized user who is registered with the entered password. The central GPS system can identify the exact location of the authorized user in a well-known manner.

The central GPS system transmits the location coordinates to the GPS-based access control system central server 120 using the network 100. The GPS-based access control system central server 120 then uses a GPS position verification system 300, discussed below in conjunction with FIG. 3, to compare the measured location of the authorized user with the known location of the device 102, 105 for which access has been requested. It is noted that the location of the device 102, 105 can be fixed and pre-recorded for each device, or may be obtained in real-time by associating an individual GPS 140 with the device 102, 105 and by using the central GPS system to verify the location of the device 102, 105 each time access is requested. If the coordinates corresponding to the measured location of the authorized user do not match the coordinates of the device 102, 105 for which access has been requested, then the access request is rejected.

In further variations, additional security measures can be obtained by implementing a local verification system for the individual GPS 140 associated with each user, to ensure that the individual GPS 140 is utilized only by the associated authorized user. For a discussion of a system and method that perform local biometric authorization on a



device, see, for example, United States Patent Number 5,953,700, entitled "Portable Acoustic Interface for Remote Access to Automatic Speech/Speaker Recognition Server," and United States Patent Application Serial Number 09/008,122, filed January 16, 1998, entitled "A Portable Information and Transaction Processing System and Method Utilizing Biometric Authorization and Digital Certificate Security," each assigned to the assignee of the present invention and incorporated by reference herein.

For example, a local verification system for the individual GPS 140 can require the user to periodically enter a password or can be based on biometrics captured using sensors. In this manner, the possibility of unauthorized access to a device 102, 105 as the result of a lost or stolen individual GPS 140 is reduced. For a discussion of a suitable local verification system for the individual GPS 140, see, for example, United States Patent Application Serial Number 09/008,122, filed January 16, 1998, entitled "A Portable Information and Transaction Processing System and Method Utilizing Biometric Authorization and Digital Certificate Security," and United States Patent Application Serial No. 09/079,754, filed May 15, 1998, entitled "Apparatus and Method for User Recognition Employing Behavioral Passwords," each assigned to the assignee of the present invention and incorporated by reference herein.

FIG. 2 illustrates an exemplary authorized user database 200 that stores information on each authorized user of the GPS-based access control system 120. The exemplary authorized user database 200 maintains a plurality of records, each associated with a different user. For each user listed in field 240, the authorized user database 200 indicates the current password in field 245 and identifies the individual GPS 140 associated with the user in field 250. In this manner, upon an attempt to access a secure device or location, the GPS identifier in field 250 can be used to obtain the current location of the authorized user.

FIG. 3 is a flow chart describing an exemplary GPS-based access control process 300 incorporating features of the present invention. As shown in FIG. 3, the GPS-

based access control process 300 is initiated during step 310 upon the user's entry of a password to request access to a device 102, 105. The access control system 130 associated with the device transmits the password to the access control system central server 120 during step 320. Thereafter, the central server 120 uses the received password to access the authorized user database 200 during step 330 and to retrieve the user name and GPS identifier, if any, associated with the password.

A test is performed during step 340 to determine if there is a GPS identified in the appropriate record of the authorized user database 200 for this user. If it is determined during step 340 that a GPS is not identified in the appropriate record of the authorized user database 200 for this user, then access is denied or other verification means are provided during step 350. If, however, it is determined during step 340 that a GPS is identified in the appropriate record of the authorized user database 200 for this user, then a request is sent to the central GPS system 101 during step 360 to determine the location of the individual GPS 140 that is identified for the authorized user (and presumably being worn by the authorized user). The identified location is received from the central GPS system 101 during step 365. In addition, the location of the device 102, 105 for which access has been requested is obtained during step 370.

A test is performed during step 380 to determine if the two positions obtained during steps 365 and 370 coincide. If it is determined during step 380 that the two positions do coincide, then access is granted during step 390. If, however, it is determined during step 380 that the two positions do not coincide, then access is denied during step 395.

According to another feature of the present invention, the location of the authorized user can be used to reduce the population of interest in evaluating biometric information. For example, all of the users within a predefined distance of the device 102, 105 from which access is being requested can be determined. In addition, biometric information is obtained about the requestor. Thereafter, biometric identification is performed to extract the individual from among the set of users who are "near" the device 102, 105.

In an alternate implementation, biometric identification can be performed over the entire population of potential users. The biometric identification system provides a list of potential names for the user requesting access. The list of top N best matches is then evaluated to determine if any of the users on the list are physically present at the location of the requested device 102, 105. Thus, the identified user must both (i) be listed on the top N list, and (ii) be physically “near” the location of the requested device 102, 105.

It is noted that the present invention is particularly useful for implementing the system described in United States Patent Application Serial Number \_\_\_\_\_, filed October 14, 1999, entitled “Point of Sale and Vending Service Payment via Portable Communication Device” (Attorney Docket Number YO999-208), assigned to the assignee of the present invention and incorporated by reference above.

It is to be understood that the embodiments and variations shown and described herein are merely illustrative of the principles of this invention and that various modifications may be implemented by those skilled in the art without departing from the scope and spirit of the invention.

## Claims

What is claimed is:

1. A method for verifying the identity of a user, said method comprising the steps of:
  - issuing a challenge to said user;
  - receiving a response to said challenge from said user;
  - identifying a location of an authorized person associated with said response;
  - identifying a location where said response is received; and
  - providing access to said user if said locations match.
2. The method of claim 1, wherein said response is a password.
3. The method of claim 1, wherein said response is a pocket token.
4. The method of claim 1, wherein said response is a computer-readable card.
5. The method of claim 1, wherein said response is biometric information.
6. The method of claim 1, wherein said location of an authorized person is obtained using an individual global positioning system.
7. The method of claim 6, wherein said individual global positioning system includes a local verification system.
8. The method of claim 6, wherein said individual global positioning system is included in a portable device carried by said authorized user.

9. The method of claim 1, wherein said location where said response is received is obtained from an individual global positioning system associated with a requested device or facility.

10. The method of claim 1, wherein said location where said response is received is obtained from recorded information associated with a requested device or facility.

11. The method of claim 1, wherein said location of an authorized person is obtained using a triangulation technique.

12. The method of claim 1, wherein said location of an authorized person is obtained using enhanced cellular 911 techniques.

13. The method of claim 1, wherein said location of an authorized person is obtained by identifying the location of a transmitting device associated with said authorized person.

14. The method of claim 1, wherein said location of an authorized person is confirmed by querying said user about something at the location of a requested device or facility.

15. The method of claim 14, further comprising the step of identifying said user by applying speaker recognition techniques to an answer to said query.

16. A method for verifying the identity of a user, said method comprising the steps of:

receiving a response to a challenge from said user;

identifying a location of an authorized person associated with said response;  
identifying a location where said response is received; and  
providing access to said user if said locations match.

5           17.           The method of claim 16, wherein said location of an authorized person is  
obtained using an individual global positioning system.

18.           The method of claim 17, wherein said individual global positioning system  
includes a local verification system.

10           19.           The method of claim 17, wherein said individual global positioning system  
is included in a portable device carried by said authorized user.

15           20.           The method of claim 16, wherein said location where said response is  
received is obtained from an individual global positioning system associated with a  
requested device or facility.

21.           The method of claim 16, wherein said location where said response is  
received is obtained from recorded information associated with a requested device or facility.

20           22.           The method of claim 16, wherein said location of an authorized person is  
obtained using a triangulation technique.

25           23.           The method of claim 16, wherein said location of an authorized person is  
obtained using enhanced cellular 911 techniques.

24. The method of claim 16, wherein said location of an authorized person is obtained by identifying the location of a transmitting device associated with said authorized person.

5 25. The method of claim 16, wherein said location of an authorized person is confirmed by querying said user about something at the location of a requested device or facility.

10 26. The method of claim 25, further comprising the step of identifying said user by applying speaker recognition techniques to an answer to said query.

15 27. A system for verifying the identity of a user, comprising:  
a memory that stores computer readable code; and  
a processor operatively coupled to said memory, said processor configured to:  
receive a response to a challenge from said user;  
identify a location of an authorized person associated with said password;  
identify a location of where said response is received; and  
provide access to said user if said locations match.

20 28. The system of claim 27, wherein said location of an authorized person is obtained using an individual global positioning system.

25 29. The system of claim 28, wherein said individual global positioning system includes a local verification system.

30. The system of claim 28, wherein said individual global positioning system

is included in a portable device carried by said authorized user.

31. The system of claim 27, wherein said location where said response is received is obtained from an individual global positioning system associated with a requested device or facility.

32. The system of claim 27, wherein said location where said response is received is obtained from recorded information associated with a requested device or facility.

33. The system of claim 27, wherein said location of an authorized person is obtained using a triangulation technique.

34. The system of claim 27, wherein said location of an authorized person is obtained using enhanced cellular 911 techniques.

35. The system of claim 27, wherein said location of an authorized person is obtained by identifying the location of a transmitting device associated with said authorized person.

36. The system of claim 27, wherein said location of an authorized person is confirmed by querying said user about something at the location of a requested device or facility.

37. The system of claim 36, wherein said processor is further configured to identify said user by applying a speaker recognition technique to an answer to said query.



38. An article of manufacture for verifying the identity of a user, comprising:  
a computer readable medium having computer readable code means embodied  
thereon, said computer readable program code means comprising:  
a step to receive a response to a challenge from said user;  
a step to identify a location of an authorized person associated with said  
response;  
a step to identify a location where said response is received; and  
a step to provide access to said user if said locations match.

39. A method for identifying a user requesting access to a device, said method  
comprising the steps of:  
receiving biometric information from said user;  
identifying each registered person within a predefined distance of said  
requested device; and  
identifying said user from among said identified persons using said biometric  
information.

40. The method of claim 39, wherein said step of identifying each registered  
person within a predefined distance of said requested device further comprises the step of  
identifying individual global positioning systems associated with registered persons within  
said predefined distance.

41. The method of claim 39, wherein said step of identifying each registered  
person within a predefined distance of said requested device further comprises the step of  
identifying transmitting devices associated with registered persons within said predefined  
distance.

42. A method for identifying a user requesting access, said method comprising the steps of:

receiving biometric information from said user;

identifying a list of potential users based on said biometric information; and

identifying said user by comparing a location of each identified potential users with a location where said biometric information was obtained.

43. The method of claim 42, wherein said location of each identified potential user is obtained by identifying the location of an individual global positioning system associated with each of said identified potential users.

44. The method of claim 42, wherein said location of each identified potential user is obtained by identifying the location of a transmitting device associated with each of said identified potential users.

45. A method for identifying of a user requesting access to a device, said method comprising the steps of:

receiving a communication from a transmitting device associated with said user;

identifying said user using a voice recognition system; and

confirming said user requesting access to said device is physically present at the location of said requested device by determining a location of said transmitting device.

46. The method of claim 45, wherein said transmitting device is a cellular telephone.

47. The method of claim 46, further comprising the step of confirming that said

user is using a cellular telephone associated with said user using caller identification techniques.

48. The method of claim 47, wherein confirming step further comprises the step of determining the location of said cellular telephone using enhanced cellular 911 techniques.

49. A system for identifying a user requesting access to a device, comprising:  
a memory that stores computer readable code; and  
a processor operatively coupled to said memory, said processor configured to:  
receive biometric information from said user;  
identify each registered person within a predefined distance of said requested device; and  
identify said user from among said identified persons using said biometric information.

50. The system of claim 49, wherein said registered persons within a predefined distance of said requested device further are identified by identifying individual global positioning systems associated with registered persons within said predefined distance.

51. The system of claim 49, wherein said registered person within a predefined distance of said requested device are identified by identifying transmitting devices associated with registered persons within said predefined distance.

52. A system for identifying a user requesting access, comprising:  
a memory that stores computer readable code; and

a processor operatively coupled to said memory, said processor configured to:

receive biometric information from said user;

identify a list of potential users based on said biometric information; and

identify said user by comparing a location of each identified potential users with a location where said biometric information was obtained.

53. The system of claim 52, wherein said location of each identified potential user is obtained by identifying the location of an individual global positioning system associated with each of said identified potential users.

54. The system of claim 52, wherein said location of each identified potential user is obtained by identifying the location of a transmitting device associated with each of said identified potential users.

55. A system for identifying of a user requesting access to a device, comprising:  
a memory that stores computer readable code; and  
a processor operatively coupled to said memory, said processor configured to:

receive a communication from a transmitting device associated with said user;

identify said user using a voice recognition system; and

confirm said user requesting access to said device is physically present at the location of said requested device by determining a location of said transmitting device.

56. The system of claim 55, wherein said transmitting device is a cellular telephone.

57. The system of claim 56, wherein said processor is further configured to

confirm that said user is using a cellular telephone associated with said user using caller identification techniques.

58. The system of claim 57, wherein said processor is further configured to  
5 determine the location of said cellular telephone using enhanced cellular 911 techniques.

58. The system of claim 57, wherein said processor is further configured to  
determine the location of said cellular telephone using enhanced cellular 911 techniques.

## **METHODS AND APPARATUS FOR VERIFYING THE IDENTITY OF A USER REQUESTING ACCESS USING LOCATION INFORMATION**

5

### **Abstract of the Disclosure**

A global positioning system (GPS)-based access control method and apparatus are disclosed for limiting access to a device or secure facility by verifying the location of an authorized user. The GPS-based access control system confirms that the user requesting access to a device or secure location is physically present at the location of the device or secure location. Upon an access control request, the location of the user is obtained using an individual GPS system carried by each user on a portable device, such as a pocket token, computer-readable card, cellular telephone or watch. If the location of a person making an access control request does not coincide with the coordinates of the individual GPS that is being worn by the authorized user associated with the password, then the person requesting access is unauthorized.

1500-61.APP

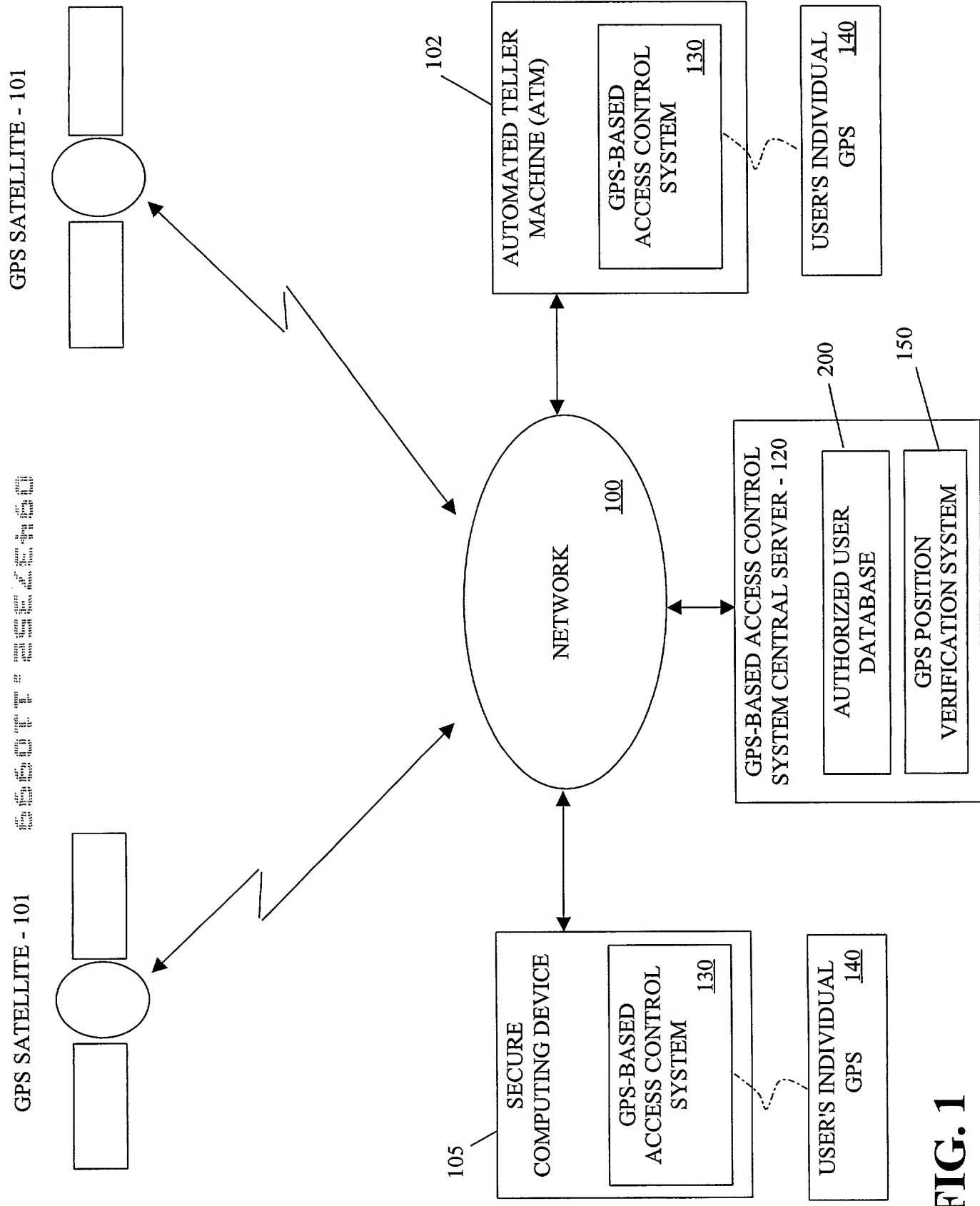


FIG. 1

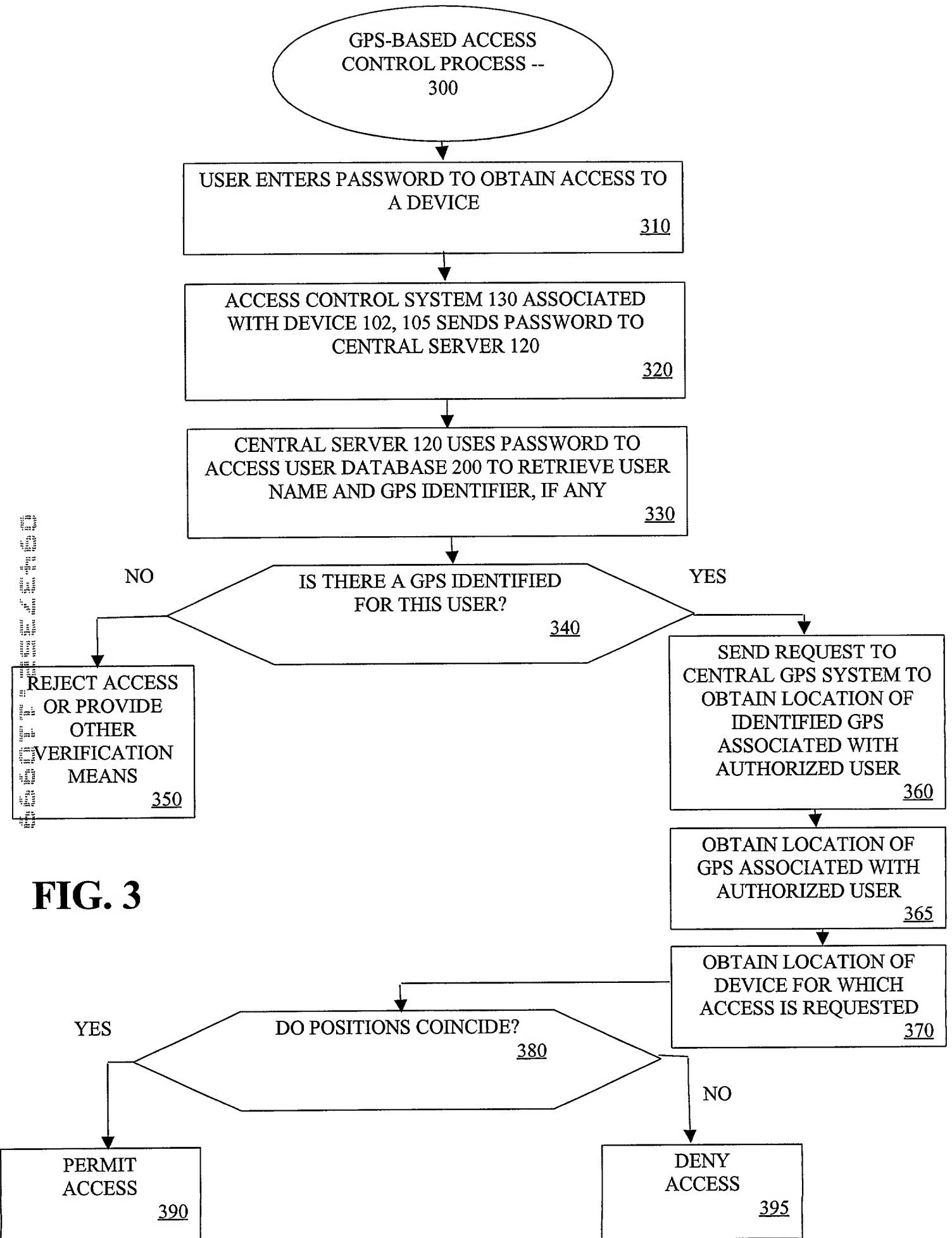
AUTHORIZED USER DATABASE -- 200

	USER 240	PASSWORD 245	GPS IDENTIFIER 250
205			
210			
215			
220			

FIG. 2

FIG. 2 is a schematic diagram of an authorized user database. The database is organized into a table with four columns: USER (240), PASSWORD (245), and GPS IDENTIFIER (250). The table contains four rows of data, labeled 205, 210, 215, and 220. Each row represents a user entry with corresponding password and GPS identifier information.





**FIG. 3**

**DECLARATION**

AS A BELOW NAMED INVENTOR, I hereby declare that:

My residence, post office address and citizenship are as stated next to my name.

I believe that I am the original, first and sole (*if only one name is listed below*), or an original, first and joint inventor (*if plural names are listed below*), of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**TITLE: METHODS AND APPARATUS FOR VERIFYING THE IDENTITY OF A USER REQUESTING ACCESS USING LOCATION INFORMATION**

the specification of which is attached hereto or indicates an attorney docket no. YO999-411, or:

☐ was filed in the U.S. Patent & Trademark Office on \_\_\_\_\_ and assigned Serial No. \_\_\_\_\_,

☐ and (*if applicable*) was amended on \_\_\_\_\_.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to patentability and to the examination of this application in accordance with Title 37, Code of Federal Regulations §1.56. I hereby claim foreign priority benefits under Title 35, U.S. Code §119(a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT international application which designated at least one country other than the United States, or §119(e) of any United States provisional application(s), listed below and have also identified below any foreign applications for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

**Priority Claimed:**

Yes [ ] No [ ]

(Application Number) (Country) (Day/Month/Year filed)

Yes [ ] No [ ]

(Application Number) (Country) (Day/Month/Year filed)

I hereby claim the benefit under Title 35, U.S. Code §120, of any United States application(s), or §365(c), of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International applications(s) in the manner provided by the first paragraph of Title 35, U.S. Code §112, I acknowledge the duty to disclose information material to patentability as defined in Title 37, Code of Federal Regulations §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial Number) (Filing Date) (STATUS: patented, pending, abandoned)

(Application Serial Number) (Filing Date) (STATUS: patented, pending, abandoned)

I hereby appoint the following attorneys: **MANNY W. SCHECTER**, Reg No. 31,722; **TERRY J. ILARDI**, Reg. No. 29,936; **CHRISTOPHER A. HUGHES**, Reg. No. 26,914; **EDWARD A. PENNINGTON**, Reg No. 32,588; **JOHN E. HOEL**, Reg No. 26,279; **JOSEPH C. REDMOND, Jr.**, Reg No. 18,753; **KEVIN M. JORDAN**, Reg No. 40,277; **STEPHEN C. KAUFMAN**, Reg No. 29,551; **JAY P. SBROLLINI**, Reg. No. 36,266; **DAVID M. SHOFI**, Reg. No. 39,835; **ROBERT M. TREPP**, Reg. No. 25,933; **LOUIS P. HERZBERG**, Reg. No. 41,500; **DANIEL P. MORRIS**, Reg. No. 32,053; **LOUIS J. PERCELLO**, Reg. No. 33,206; **PAUL J. OTTERSTEDT**, Reg. No. 37,411; and **DOUGLAS W. CAMERON**, Reg. No. 31,596; each of them of **INTERNATIONAL BUSINESS MACHINES CORPORATION**, Thomas J. Watson Research Center, P.O. Box 218, Yorktown Heights, New York 10598; to prosecute this application and to transact all business in the U.S. Patent and Trademark Office connected therewith and with any divisional, continuation, continuation-in-part, reissue or re-examination application, with full power of appointment and with full power to substitute an associate attorney or agent, and to receive all patents which may issue thereon, and request that all correspondence be addressed to:

Kevin M. Mason  
 RYAN & MASON, L.L.P.  
 90 Forest Avenue  
 Locust Valley, NY 11560  
 Tel.: (203) 255-6560

I HEREBY DECLARE that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 U.S. Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

FULL NAME OF FIRST OR SOLE INVENTOR: Dimitri Kanevsky Citizenship U.S.A.

Inventor's signature: \_\_\_\_\_ Date: \_\_\_\_\_

Residence & Post Office address: 1358 Spring Valley Road  
Ossining, NY 10562

FULL NAME OF SECOND JOINT INVENTOR: Stephane Herman Maes      Citizenship Belgium

Inventor's signature: \_\_\_\_\_ Date: \_\_\_\_\_

Residence & Post Office address: 1 Wintergreen Hill Road  
Danbury, CT 06811

Year	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100																																																		
Population	1000000	1050000	1100000	1150000	1200000	1250000	1300000	1350000	1400000	1450000	1500000	1550000	1600000	1650000	1700000	1750000	1800000	1850000	1900000	1950000	2000000	2050000	2100000	2150000	2200000	2250000	2300000	2350000	2400000	2450000	2500000	2550000	2600000	2650000	2700000	2750000	2800000	2850000	2900000	2950000	3000000	3050000	3100000	3150000	3200000	3250000	3300000	3350000	3400000	3450000	3500000	3550000	3600000	3650000	3700000	3750000	3800000	3850000	3900000	3950000	4000000	4050000	4100000	4150000	4200000	4250000	4300000	4350000	4400000	4450000	4500000	4550000	4600000	4650000	4700000	4750000	4800000	4850000	4900000	4950000	5000000	5050000	5100000	5150000	5200000	5250000	5300000	5350000	5400000	5450000	5500000	5550000	5600000	5650000	5700000	5750000	5800000	5850000	5900000	5950000	6000000	6050000	6100000	6150000	6200000	6250000	6300000	6350000	6400000	6450000	6500000	6550000	6600000	6650000	6700000	6750000	6800000	6850000	6900000	6950000	7000000	7050000	7100000	7150000	7200000	7250000	7300000	7350000	7400000	7450000	7500000	7550000	7600000	7650000	7700000	7750000	7800000	7850000	7900000	7950000	8000000	8050000	8100000	8150000	8200000	8250000	8300000	8350000	8400000	8450000	8500000	8550000	8600000	8650000	8700000	8750000	8800000	8850000	8900000	8950000	9000000	9050000	9100000	9150000	9200000	9250000	9300000	9350000	9400000	9450000	9500000	9550000	9600000	9650000	9700000	9750000	9800000	9850000	9900000	9950000	10000000
GDP	10000000000	10500000000	11000000000	11500000000	12000000000	12500000000	13000000000	13500000000	14000000000	14500000000	15000000000	15500000000	16000000000	16500000000	17000000000	17500000000	18000000000	18500000000	19000000000	19500000000	20000000000	20500000000	21																																																																																																																																																														